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ABSTRACT

Operation Minerva is a science conference which originated in Calgary (Alberta, Canada) to provide young girls with positive experiences in math, the sciences, and technology. The program was adopted by a group of Rocky View teachers and parents who revised the program to meet the needs of their rural students. The program involved 40 eighth grade students, who had the opportunity to meet and "job shadow" for 1 day with a female mentor working in one of the scientific professions. The second day of the conference was spent at the University of Calgary participating in hands-on science workshops which allowed the students to experience the fields of engineering, forensic science, biomechanics, and biology. The conference was felt to be a great success. Ninety-three percent of the participants reported that the conference was very helpful or somewhat helpful in clarifying their occupational goals, and 72 percent of the girls said the conference helped them discover new careers. This paper provides a rationale for the conference, describes conference goals and objectives, and notes funding sources. (JDD)

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Operation Minerva Rocky View • Mentoring Young Girls in Science

Jean Makosz • Jan McGregor • Diane Bell • Joan Gusa • Tracey Wong
Operation Minerva

Science Conference for Girls, December 4-5, 1992.

Operation Minerva is a science conference, specifically designed to provide young girls with positive experiences in math, the sciences and technology. Minerva, the Roman goddess of the practical arts and crafts, was chosen to symbolize the training and skills required by those who work in these fields.

The Operation Minerva organization originated in Calgary under the direction of Joyce Luethy and a number of science based educators and professionals who were concerned about the limited numbers of women working in mathematical, scientific and technical careers. In 1992,the program was adopted by a small group of Rocky View teachers and parents who revised the program to meet the rural needs of their students.

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Rationale and Conference Goals:

Throughout the Western world, there is concern that fewer females than males are employed in scientific and technical occupations, particularly those related to mathematics, physics and computer applications (Haggerty, 1987). Presently, only 9-10% of the workforce involved in science and engineering related careers in the U.S.A. and Canada are women (Klein, 1988).

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In Canada, the number of females enrolled in math, science and technological courses begins decreasing in high school and continues throughout university (Calgary Herald, 1990).

The workplace in the 1990's is evolving and changing at an accelerated pace. With globalization and technological advances, many of the clerical, sales and service jobs, which presently employ large numbers of women will disappear.

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The majority of young women will remain in the workforce for 25-45 years. The Canadian Teachers Federation (1988) has demonstrated that 85% of future careers will require the successful completion of at least high school math and science. Presently, women make up a larger percentage of the poor in Canada than men (Livingstone,1989). It is therefore very important that women develop the skills which will be necessary to access future employment.

We decided to target the Operation Minerva Conference towards grade 8 girls, as current research shows that this is the age when girls begin to lose interest in science and math. Young adolescent females who are trying to establish ego-identity and to win social approval are most often attracted to careers which enhance their feminine image (Head, 1979). In fact, the desire to belong to the peer group in adolescence is so strong that girls will hide their talents and diminish their individuality in an effort to conform (Batcher, 1987). Unless these girls receive strong encouragement from their teachers and parents, few will opt for a career in the sciences.

In grade 9, girls begin to make choices about the academic courses they will study in high school, and need to make educated decisions about their future careers. It is therefore important that they are introduced to positive female role-models and counsellors in scientific careers.

In regular science classrooms, girls seldom adopt leadership roles as boys often dominate classroom discussions and student-teacher interactions (Kelly, 1987). The Minerva committee wanted to create a supportive environment where girls could express themselves openly and without inhibition. They therefore decided that a "girls only" conference was appropriate.

The conference was finally designed to achieve the following objectives.

Conference Objectives:

1. Stimulate young women's awareness of and interest in careers in science, mathematics and technology.

2. Provide adolescent girls with positive experiences in science and technology.

3. Introduce positive female role-models and counsellors from the technical and scientific professions.

4. Encourage students to continue the study of science, math and technology in high school and further education.

5. Increase awareness in educational institutions and private corporations of the need to encourage female involvement in science and technology.

6. Give science a human face.

The Conference

A group of forty grade 8 students fom Middle schools within the Rocky View School Division had the opportunity to meet and "job-shadow" for one day with a female mentor working in one of the scientific professions. As often as possible, students were matched with mentors working in careers in which they had expressed an interest. Our list of mentors was extensive, including a dentist, anaesthetist, physiotherapist, family doctor, occupational therapist, lab. technician, geneticist, medical researcher, nurse, radiologist, veterinarian, biologist, marine biologist, park ranger, engineer, geologist and statistician.

Following their job-shadow experience, students returned to Rocky View Central Office to debrief. The girls were involved in ice-breaking and teamwork activities. They were also given the opportunity to socialize and have fun.

The second day of the conference was spent at the University of Calgary participating in a number of different "hands-on" science workshops which allowed the students to experience engineering, forensic science, bio-mechanics and biology.

Consequently, students had contact with a number of female mentors

and role-models, from a wide range of scientific fields, who were able to provide encouragement and career counselling. By allowing our students to experience a supportive network of female professionals, we hoped to present a "human face to science." We also tried to to break down the current, stereotypical image of the socially isolated, female scientist by introducing the girls to mentors with active social and family lives. At the conference, the girls were able to socialize with their own peer group, and to realize that there are many other girls interested in science careers.

Conclusions

Most girls who participated in the conference expressed interest in several, different careers, and hoped that their experience with Operation Minerva would allow them to gain an insight into at least one of these professions. Many students also saw the conference as a chance to widen their knowledge of different career opportunities. Others sought information which would allow them to choose high school courses wisely.

The majority of students expressed interest in science careers which could be labelled "nurturing," for example medicine, animal sciences and education. A much smaller percentage were interested in the "functional" sciences such as engineering, technology and applied sciences.

There is no doubt that the conference was a great success. The job-shadowing experience was highly praised, and longer and repeat sessions were requested. The mentors who provided students with practical and "hands-on" experiences were given the most positive evaluations. The university work-shops were also popular but were most beneficial when directly linked to students' interests. All of the students enjoyed the university experience.

When asked if the conference had helped them discover new careers, 72% of the girls said Yes, 25% said No, and 2% were undecided. In addition, 51% said that the conference was very helpful in allowing them to clarify their occupational goals, 42% said somewhat helpful, and 2% said not at all.

A number of girls expressed a desire to enter a scientific career but were still unaware of the necessary high school courses required. Few had discussed high school courses or science and technology careers with their teachers, indicating a need for further career counselling at the school

level.

Funding for the conference was provided by donations from Rocky View School Division, the Science Alberta Foundation, corporations and student registration fees. It is difficult to raise corporate donations during an economic recession. However, with volunteer help and a tight control of expenditure, the committee discovered that a massive fund-raising drive was not necessary to ensure an effective conference.

The women volunteers were an essential feature of Operation Minerva. Many professional women donated their time and energy to support and encourage young, female scientists.

The success of the conference is most easily described in the words of one of the students :

- This conference was great. It taught me a lot about actually working and hands-on experience. It was fun and educational..... The price was great and the activities were excellent. I hope in the future, I will get to talk to the Operation Minerva girls when I'm a civil engineer."

Jean Makosz for:

The Minerva Team:

Jan McGregor (Coordinator)
Diane Bell
Joan Gusa
Tracey Wong

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